REMARKS

Claims 1 and 3-24 are pending in the application.

Claim Rejections under 35 U.S.C. § 103(a)

I. Claims 1-6 and 8 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,450,117 to Murugesh et al. in view of U.S. Patent No. 5,158,644 to Cheung et al. and U.S. Patent No. 6,663,025 to Halsey et al.

Independent claim 1 and the claims which depend therefrom are patentable under 35 U.S.C. 103(a) over Murugesh et al. in view of Cheung et al. and Halsey et al. because the cited references do not establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness under 35 U.S.C. 103(a):

(a) The claimed invention must be considered as a whole;

(b) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;

(c) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and

(d) Reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

1. The Combination of Murugesh et al., Cheung et al. and Halsey et al. Does Not Teach Claim 1 as a Whole.

The combination of Murugesh et al., Cheung et al., and Halsey et al. does not teach claim 1 as a whole. Claim 1 is to a gas distributor comprising, inter alia, a baffle with opposing first and second surfaces, and having a plurality of first vanes located on the first surface, each first vane comprising an arcuate plate that curves

outward from the hub to the outer perimeter of the baffle. A plurality of second vanes on the second surface of the baffle are configured to direct the gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor.

Murugesh et al. does not teach a gas distributor comprising a plurality of first vanes that each comprise an arcuate plate that curves outward from the hub to the outer perimeter of the baffle. Instead, Murugesh et al. teaches a baffle comprising ridges which have a different structure than the claimed arcuate plates. Specifically, Murugesh et al. teaches:

> ... the second gas distributor 245 comprises one or more gas outlets 247 between ridges 245. [Murugesh et al., Column 7, Lines 16-17]

Murugesh et al. further teaches that:

> ...the cleaning gas 70 flows upward along the concave surfaces 251 between the ridges 245 to impinge upon, and circulate along the surface of the ceiling 55. [Murugesh et al., Column 7, Lines 30-32].

This description together with the drawings of FIGS. 2A and 2B of Murugesh et al., demonstrate that the ridges 245 are triangular protrusions having gently sloped concave sidewalls. Ridges comprising triangular protrusions having concave shaped sidewalls, as taught by Murugesh et al., are not the same structure as the claimed arcuate plate - which is a straight walled structure that is curved to have an arcuate form. Thus Murugesh et al. does not teach a gas distributor comprising a plurality of first vanes that each comprise an arcuate plate that curves outward from the hub to the outer perimeter of the baffle, as claimed in claim 1.

Further, the Dictionary definition of "ridge" is:

> an elongate crest or a linear series of crests ... (and/or) ... the line of intersection at the top between the opposite slopes or sides of a roof

[Merriam-Webster Online Dictionary, http://www.merriam-webster.com/dictionary/ridge] Even under this dictionary definition, the claimed structure of the first vanes comprising a plurality of arcuate plates does not fall under the definition of a ridge. An arcuate plate, as claimed, is not an elongated crest or a linear series of crests, which is the definition of ridge. Moreover, even if the word "ridge" is broadly defined to include

many different types of protruding structures, it does not teach the specific structure claimed in claim 1, namely, "...first vanes that each comprise an arcuate plate that curves outward from the hub to the outer perimeter of the baffle".

For these reasons, the ridges as taught by Murugesh et al. are not the same structure as the arcuate plates claimed in claim 1, and accordingly, Murugesh et al. does not teach a gas distributor comprising "...first vanes that each comprise an arcuate plate that curves outward from the hub to the outer perimeter of the baffle" as claimed in claim 1.

Furthermore, as recognized by the Office Action, Murugesh et al. does not teach a gas distributor comprising second vanes on the second surface of the baffle that direct the received gas across the second surface of the baffle. Murugesh et al. makes no mention of having second vanes on the second surface of a baffle of the gas distributor. Nor does Murugesh et al. teach second vanes that direct the received gas across the second surface of the baffle, as claimed.

In addition, Murugesh et al. does not teach a gas distributor having a combination of a plurality of first vanes located on a first surface of the baffle, and a plurality of second vanes on the second surface of the baffle which have a different function than the first vanes. The first vanes each comprise arcuate plates, and instead Murugesh et al. teaches ridges. The second set of vanes are configured to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor, and this structure is also not taught by Murugesh et al. Thus, clearly, Murugesh et al. does not teach claim 1 as a whole.

Cheung et al does not cure the deficiencies of Murugesh et al. As acknowledged by the Office Action, Cheung et al. is directed to a method of cleaning RF

electrodes with a cleaning plasma. Specifically, Cheung et al. teaches:

> The local etch is used to clean the RF electrodes, i.e., the susceptor 12 and the inlet gas manifold faceplate 30.

[Cheung et al., Column 4, Lines 45-47] The cleaning method taught by Cheung et al. does not teach a gas distributor comprising a baffle with opposing first and second surfaces, and having a plurality of first vanes located on the first surface, and a plurality of second vanes on the second surface of the baffle. Cheung et al. also does not teach a gas distributor comprising first vanes that each comprise an arcuate plate that curves outward from the hub to the outer perimeter of the baffle. Cheung et al. further does not teach a plurality of second vanes configured to direct the gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Thus, Cheung et al. also does not teach claim 1 as a whole, and does not cure the deficiencies of Murugesh et al.

Halsey et al. fails to make up for the deficiencies of Murugesh et al. and Cheung et al. because Halsey et al. also does not teach a gas distributor comprising a combination of first vanes on a first surface of the baffle, and a plurality of second vanes on a second surface which opposes the first surface. Instead, Halsey et al. teaches a diffuser with a single set of vanes on one surface. The opposing surface of the diffuser is flat and smooth surface without vanes on the opposing side of the diffuser. (Halsey et al., Figures 4A and 4B.)

Moreover, the vanes of Halsey et al. are not the same structure as the claimed arcuate plates that curve outward from the hub to the outer perimeter of the baffle, as claimed in claim 1. Instead, the vanes of Halsey et al. are annular structures, as shown in FIG. 2 and FIG. 4B. Thus Halsey et al. also does not teach vanes comprising arcuate plates as in claim 1.

Thus neither Murugesh et al., Cheung et al. or Halsey et al. teach claim 1 as a whole.

2. Murugesh et al. in view of Cheung et al. and Halsey et al. do not Motivate Derivation of Claim 1.

Murugesh et al. in view of Cheung et al. and Halsey et al. do not motivate derivation of the gas distributor of claim 1. Under the second part of the obviousness test, the combination of cited references, considered as a whole, must teach or suggest the desirability of the claimed subject matter. To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings. In re Vaeck, 947 F.2d 488 (Fed. Cir. 1991). See also MPEP § 2143 - § 2143.03.

Murugesh et al. does not motivate derivation of a gas distributor comprising, inter alia, a baffle with opposing first and second surfaces, and with a plurality of first vanes located on the first surface, each first vane comprising an arcuate plate that curves outward from the hub to the outer perimeter of the baffle. Instead, Murugesh et al. teaches a gas distributor comprising ridges that are shaped as triangular protrusions with concave sidewalls. One of ordinary skill in the art would not be motivated to derive first vanes comprising arcuate plates from the triangular ridge structures taught by Murugesh et al. Further, by teaching that ridges are adequate for cleaning of process residues, Murugesh et al. teaches away from the necessity of deriving the more complex arcuate plate structures of claim 1, which allow cleaning of process residues from the chamber surfaces using less cleaning gas (see Specification, page 8, lines 20-35).

Further, as acknowledged by the Office Action, Murugesh et al. does not teach and also does motivate derivation of a gas distributor which has a set of second vanes that direct process gas from a second terminus across a surface of the gas distributor itself, to clean the surface. Instead, Murugesh et al. teaches a gas distributor having a single surface 215 with ridges 245 which direct cleaning gas across the sidewall and ceiling of the chamber to clean the chamber surfaces, and not the surface

of the gas distributor itself. The second vanes to direct process gas across a second surface of the gas distributor serve a self-cleaning function, as taught by the Specification:

> The flow of gas across the second surface **60** of the baffle **56** cleans this surface **60**, and thus, the gas distributor **20** is self cleaning. This self-cleaning can be especially useful as the second surface **60** is susceptible to the build-up of process residues because it generally faces the substrate in the chamber and thus proximate to a process zone in which processes are concentrated in the chamber. This is a significant advantage over prior art gas distributors which allowed build-up of residues on surfaces exposed to the plasma or process gas environment in the chamber and which were not exposed to direct flow streams of cleaning gas.

(Specification, page 9, lines 9-14)

Murugesh et al. further does not motivate derivation of a gas distributor having a combination of a plurality of first vanes located on a first surface of the baffle, and a plurality of second vanes are on the second surface of the baffle which have a different function than the first vanes, namely, that the second set of vanes are configured to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Nor does Murugesh et al. teach or suggest the advantages that can be obtained from a gas distributor having two sets of vanes on opposing surfaces, with one set of vanes having a structure adapted to clean residues formed on the process gas distributor itself and the other provided to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor.

Cheung et al. fails to make up for the deficiencies of Murugesh et al. because Cheung et al. also does not motivate derivation of the claimed gas distributor. Cheung et al. teaches a cleaning method and not the claimed gas distributor structure. Cheung et al. also does not teach, or suggest derivation of, a gas distributor comprising a baffle with opposing first and second surfaces, and with a plurality of first vanes

located on the first surface, each first vane comprising an arcuate plate that curves outward from the hub to the outer perimeter of the baffle, and a plurality of second vanes on the second surface of the baffle. Nor does Cheung et al. suggest a gas distributor having second vanes adapted to direct the gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Furthermore, one of ordinary skill in the art would not combine Murugesh et al. with Cheung et al., each deficient to specific elements of the present invention, to derive additional elements not taught by either reference to teach the gas distributor recited in claim 1. There is simply no motivation cited to create the presently claimed structure, other than that obtained in hindsight from the disclosure of Applicants' own Specification.

Halsey et al. also does not teach, or suggest derivation of, a gas distributor comprising a baffle with opposing first and second surfaces, and with a plurality of first vanes located on the first surface, each first vane comprising an arcuate plate that curves outward from the hub to the outer perimeter of the baffle, and a plurality of second vanes on the second surface of the baffle. Instead, as shown in FIG. 4B, Halsey et al. teaches a plurality of vanes on a first surface of the gas distributor and is absent a teaching to second vanes on an opposing surface of the same structure. Further, by teaching that the gas distributor comprises guide vanes which are shaped as concave depressions, Halsey et al. teaches away from the claimed gas distributor, which comprises first vanes comprising arcuate plates, and second vanes on an opposing surface.

Halsey et al. also does not motivate derivation of a gas distributor having second vanes adapted to direct the gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Halsey et al. further does not suggest deriving a distributor that is self-cleaning by directing process gas across the surface of the baffle to clean the gas distributer. Instead, Halsey et al. teaches that the diffuser is "used to vent gas into a chamber or pump the gas out of a chamber to provide a vacuum condition." (Halsey et al., Col. 7, lines 42-44.) Halsey et al. further

teaches a gas distributor that is adapted to slowdown the flow of gas into the chamber so that the gas flows out into the open space of the chamber with a slower velocity. (Column 2 lines 52-57). Thus Halsey et al. does not teach second vanes to direct the gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor, as claimed in claim 1.

Halsey et al. does not teach the structure of a gas distributor comprising a set of first vanes configured to direct the process gas expelled from a first terminus across a chamber surface, and a set of second vanes configured to direct process gas expelled from a second terminus across the second surface of the baffle to clean the gas distributor. Instead, Halsey et al. teaches a diffuser to vent gas into the chamber, and while doing so, slowdown the flow of gas into the chamber so that the gas flows out into the open space of the chamber with a slower velocity. Thus the teachings of Halsey et al. do not motivate derivation of claim 1.

Further, as explained in the Specification, the claimed gas distributor has specific advantages derived from the structure of first vanes comprising arcuate plates that curve outward from the hub to the outer perimeter of the baffle on one of its surfaces, and second vanes that flow gas expelled from the second terminus across the second surface of the baffle. The flow of gas directed by the second vanes across the second surface of the baffle cleans this surface; and thus, the claimed gas distributor is self-cleaning. This self-cleaning action is especially useful as the second surface is especially susceptible to the build-up of process residues because it generally faces the substrate in the chamber, and thus, is more proximate to the process zone in which such processes residues are formed. The structural feature of the first and second vanes provides a significant advantage over prior art gas distributors which allow build-up of residues on surfaces exposed to the plasma or process gas environment in the chamber. In addition:

> "The spiral pattern of the arcuate plates 76 imparts an outward, swirling directional motion of the flow 59 of a gas, such as a cleaning gas, across the chamber surfaces. The swirling gas pattern provides better cleaning of chamber

surfaces by allowing the gas to distribute more uniformly across these surfaces and reduces stagnant gas regions."

(Specification, page 8, lines 20-24). In addition, and surprisingly, the gas distributor having a plurality of first vanes located on the first surface, each vane comprising an arcuate plate that curves outward from the hub to the outer perimeter of the baffle, also provides reduced corrosion of exposed chamber surfaces:

"Also, the gas flow 59 can reduce corrosion of exposed chamber surfaces because a lower flow rate of gas can be used to more effectively clean the chamber surfaces, thereby reducing the likelihood that particular chamber regions or surfaces are exposed to excessive quantities of corrosive gas."

(Specification, page 8, lines 27-30). The combination of Murugesh et al. with Cheung et al. and Halsey et al. simply does not provide any suggestion or motivation that would allow one of ordinary skill in the art to derive the advantages of a gas distributor structure having first and second vanes on opposing surfaces, as recited in claim 1.

For these reasons, Murugesh et al., in view of Cheung et al. and Halsey et al. do not motivate derivation of the gas distributor of claim 1.

3. The Combination of Murugesh et al. in view of Cheung et al. and Halsey et al. Does Not Have a Reasonable Expectation of Success Absent Hindsight Knowledge.

Furthermore, the gas distributor derived by the combination of Murugesh et al. in view of Cheung et al. and Halsey et al. does not have a reasonable expectation of success based on the teachings of Murugesh et al., Cheung et al. and Halsey et al., and without the hindsight knowledge derived from Applicant's invention.

Murugesh et al. does not teach a gas distributor comprising a baffle with a plurality of first vanes that each comprise an arcuate plate that curves outward from the hub to the outer perimeter of the baffle. Instead, Murugesh et al. teaches a gas distributor having a first surface comprising triangular protrusions having gently sloped

concave sidewalls and not arcuate plates. Further, Murugesh et al. also does not teach second vanes on opposing surface of the baffle, or the advantages of having second vanes to have a self-cleaning gas distributor. Instead, Murugesh et al. teaches only a gas distributor which flows gas across chamber surfaces. Thus one of ordinary skill upon reading Murugesh et al. would not have derived the claimed structure comprising a self-cleaning gas distributor which has both first and second vanes, and in which the second vanes are directed solely to clean a surface of the gas distributor itself, based on the teachings of Murugesh et al. and without hindsight knowledge from Applicant's own disclosure. Nor is there any reasonable expectation of success of a structure according to Applicant's claim 1, which comprises a second set of vanes, to be derived based only on the teachings of Murugesh et al.

Furthermore, the structure derived by combining the teachings Cheung et al. with Murugesh et al. also does not provide a reasonable expectation of success. Cheung et al. teaches a reactor chamber self-cleaning process comprising varying the electrode separation and chamber pressure to locally clean the gas inlet manifold (Abstract). However, Cheung et al. does not teach or suggest "a baffle with opposing first and second surfaces, and with a plurality of first vanes located on the first surface, each first vane comprising an arcuate plate that curves outward from the hub to the outer perimeter of the baffle, and a plurality of second vanes are on the second surface of the baffle" as claimed. Nor does Cheung et al. teach "plurality of second vanes are configured to direct the gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor" as claimed. Teachings to a self-cleaning plasma process from Cheung et al. cannot be used to derive the missing second vanes, which are not found in gas distributor structure taught by Murugesh et al.

In addition, Cheung et al. teaches away from a gas distributor structure comprising first and second vanes as claimed. Cheung et al. teaches that a cleaning plasma is sufficient to clean the gas distributor or other surfaces of structures within the chamber. Thus one of ordinary skill in the art would not have a reasonable expectation of success of a gas distributor comprising second vanes to direct a cleaning gas to a

pre-existing structure comprising first vanes. The resultant structure is not necessary according to the teachings of Cheung et al., and would only serve to provide additional surfaces that need cleaning within the chamber, and thus serve no useful purpose. Thus, Cheung et al. in combination with Murugesh et al., does not provide a gas distributor structure according to claim 1.

Moreover, Halsey et al. also does not cure the deficiencies of Cheung et al. in combination with Murugesh et al. Halsey et al. makes no mention of a gas distributor which is self-cleaning or capable of directing process gas across the surface of a baffle of the gas distributor to clean the same. Instead, Halsey et al. teaches a diffuser which is "used to vent gas into a chamber or pump the gas out of a chamber to provide a vacuum condition." (Halsey et al., Col. 7, lines 42-44.) Halsey et al. does not teach the basic structure of a set of first vanes configured to direct the process gas expelled from the first terminus across a chamber surface, and a set of second vanes configured to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Halsey is entirely missing one set of vanes.

Moreover, even if one of ordinary skill in the art were to combine the vanes taught by Halsey et al. into the gas distributor structure taught by Murugesh, one would not have a reasonable expectation of success that the resultant gas distributor structure would be self-cleaning. Halsey et al. uses vanes having a structure comprising concentric dish-like depressions to slow the flow of gas, and Murugesh et al. does not teach first vanes comprising arcuate plates. Further, Cheung et al. teaches a self-cleaning plasma, and Cheung et al. in combination with Murugesh et al. does not teach the claimed self-cleaning gas distributor structure comprising first and second vanes on opposing surfaces. Thus the combination of Halsey et al., Cheung et al. and Murugesh et al. do not provide a structure which has a reasonable expectation of success.

For these reasons, Murugesh et al., Cheung et al. and Halsey et al. do not teach or suggest claim 1 as a whole, do not motivate derivation of a structure as claimed, and in combination do not describe a structure comprising a gas distributor having a baffle and a plurality of first vanes on one surface, and second vanes on the another surface of the baffle, the second vanes configured to direct the process gas expelled from the second terminus to clean the gas distributor. For at least the same reasons, the combination of Murugesh et al., Cheung et al. and Halsey et al. do not teach or suggest the claims dependent from claim 1.

Claims 3-6 and 8

The Office Action also rejected claims 3-6 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Murugesh et al. in view of Cheung et al. and Halsey et al.

Claims 3-6 and 8 depend upon claim 1, and claim 1 is not obvious over Murugesh et al. in view of Cheung et al. and Halsey et al. for at least the reasons expressed above. To avoid repetition, these reasons will not be repeated herein.

Claim 7

The Office Action rejected claim 7 under 35 U.S.C. §103(a) as being unpatentable over Murugesh et al. in view of Cheung et al. and Halsey et al., as applied to claims 1, 3-6, and 8 and further in view of Wheat et al. (U.S. Publication 2003/0116278).

Claim 7 depends upon claim 1 and is patentable for the same reasons as claim 1, namely that Murugesh et al. in view of Cheung et al. and Halsey et al. do not teach or suggest a gas distributor comprising a combination of a first set of vanes on a first surface and a second set of vanes on the second surface, each first vane comprising an arcuate plate that curves outward from the hub to the outer perimeter of the baffle.

Further, as acknowledged by the Examiner, Murugesh et al. in view of Cheung et al. and Halsey et al. do not teach that second vanes that comprise plurality of wedges as recited in claim 7.

Wheat et al. fails to make up for the deficiencies of Murugesh et al., Cheung et al. and Halsey et al. because Wheat et al. also does not teach or suggest a combination of a plurality of first vanes on the first surface of the baffle, and a plurality of second vanes on the second surface of the baffle that direct the gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Instead, Wheat et al. teaches a gas baffle having a smooth top and bottom surfaces without any vanes. (Wheat et al., Figs. 1 and 2.)

Wheat et al. also does not teach a baffle comprising a first surface with "first vanes comprising arcuate plates that curve outward from the hub to the outer perimeter of the baffle on the first surface of the baffle", as recited in claim 1. Nor does Wheat et al. teach second vanes on the second surface of the baffle that comprise a plurality of wedges, as recited in claim 7, or the advantages of the same, namely a self-cleaning baffle. Thus, Wheat et al. is also deficient because the gas distributor of Wheat et al. is not taught to have a self-cleaning structure. Wheat et al. makes no mention of the gas distributor being able to pass a gas along a surface of the distributor to clean such surface.

For these reasons, claim 7 is patentable over Murugesh et al. in view of Cheung et al, and Halsey et al., and further in view of Wheat et al.

Claim 9

The Office Action rejected claim 9 under 35 U.S.C. §103(a) as being unpatentable over Murugesh et al. in view of Cheung et al., Halsey et al. and Frijlink (U.S. Publication 2004/0200412).

Claim 9 depends upon claim 1 and is patentable for the same reasons as claim 1, namely Murugesh et al. in view of Cheung et al. and Halsey et al. does not render claim 1 obvious, as the cited references do not teach or suggest a gas distributor comprising a combination of sets of first vanes and sets of second vanes.

Frijlink further fails to make up for the deficiencies of Murugesh et al. and Halsey et al. because Frijlink also does not teach or suggest a plurality of first vanes on the first surface of the baffle, and a plurality of second vanes on the second surface of the baffle which direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor. Instead, Frijlink teaches a process chamber with isolation means to "prevent the reactive gases from flowing into spaces of the reactor other than the space immediately above the substrate holders and the wafers." (Frijlink, paragraph [0027], lines 1-4). Frijlink does not teach or suggest a plurality of first vanes on the first surface of the baffle. Nor does Frijlink teach a plurality of second vanes on the second surface of the baffle that direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor.

For at least these reasons, claim 9 is not obvious over Murugesh et al. in view of Cheung et al., Halsey et al. and Frijlink.

Claim 10

The Office Action rejected claim 10 under 35 U.S.C. §103(a) as being unpatentable over Murugesh et al., in view of Cheung et al., in view of Halsey et al., as applied to claims 1, 3-6 and 8 and further in view of Horie et al. (U.S. Patent 6,132,512).

Claim 10 is to a combination process and cleaning gas distributor comprising the gas distributor according to claim 1. The process gas distributor has a process gas inlet and a showerhead gas distribution faceplate. Claim 10 is dependent on claim 1, and is patentable over the combination of Murugesh et al., Cheung et al. and Halsey et al., because, as discussed above, these references do not teach or

suggest a gas distributor comprising plurality of first vanes on the first surface of the baffle, each first vane comprising an arcuate plate that curves outward from the hub to the outer perimeter of the baffle, and a plurality of second vanes on the second surface of the baffle that direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor, as in amended claim 1.

Horie et al. fails to make up for the deficiencies of Murugesh et al. and Halsey et al. because Horie et al. also does not teach or suggest a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle. Halsey et al. also does not teach that the second vanes are configured to direct process gas across the second surface of the baffle to clean the distributor. Instead, Horie et al. teaches "a gas ejection head for use in a vapor-phase thin-film growth apparatus, comprising a planar nozzle head body having a plurality of nozzle orifices for uniformly ejecting a film deposition therethrough." (Horie et al., Col. 4, lines 54-57.) Horie et al. further teaches:

> "...the gas injection head includes a nozzle head body 20 which comprises a disk 21 having a plurality of parallel fitting grooves 21a defined in an upper surface thereof and a plurality of parallel fitting grooves 21a defined in a lower surface thereof. The fitting grooves 21a defined in the upper and lower surfaces of the disk 21 extend perpendicularly to each other. Slender liquid passage members 22, each having a channel-shaped cross section defining a liquid passage groove 23, are fitted in the respective fitting grooves 21a defined in the upper and lower surfaces of the disk 21, with the liquid passage grooves 23 opening toward the bottoms of the fitting grooves 21a."
>
> (Horie et al., Col. 8, line 59 to Col. 9, line 3 and Fig. 8A, 8B and 8C.)

Thus, Horie et al. does not teach or suggest even a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle, as in claim 1.

For at least these reasons, claim 10 is patentable over Murugesh et al. in view of Halsey et al. and Horie et al.

Claims 11-14

The Office Action rejected claims 11-14 under 35 U.S.C. §103(a) as being unpatentable over Redeker et al. (U.S. Patent No. 6, 182,602) in view of Murugesh et al., Cheung et al., Halsey et al. and Frijlink.

The combination of Redeker et al., Murugesh et al., and Halsey et al., Cheung et al., Halsey et al. and Frijlink do not teach claim 11 which is to a self-cleaning gas distributor to distribute a process gas from an external source across surfaces in a substrate processing chamber having a wall with a cavity.

As acknowledged by the Examiner, Redeker et al. does not teach a gas distributor having a first channel along external surface of hub; a baffle plate extending radially outward from the hub, the baffle plate comprising first and second surface, an outer perimeter, and an aperture capable of allowing passage of the gas along the second channels; a plurality of first vanes on the first surface of the baffle plate, each first vane comprising an arcuate plate that curves outward from the hub, a plurality of second vanes on the second surface of the baffle plate, each second vane comprising a surface inclined to the second surface of the baffle plate; whereby the first vanes direct the gas across the surfaces of the chamber, the second vanes direct the gas across the second surface of the baffle plate, and the a gas feed-through tube that allows the gas to by pass the first and second set of vanes.

As further acknowledged by the Examiner, Redeker et al. in view of Murugesh et al. does not teach second vanes on the second surface of the baffle and where second vanes direct the received gas across the second surface of the baffle.

Halsey et al. fails to make up for the deficiencies of Redeker et al. and Murugesh et al. because Halsey et al. does not teach or suggest a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle, as discussed above. Instead, Halsey et al. teaches a diffuser with guide vanes

on the surface of one side of the diffuser and a smooth and flat surface on the opposing side of the diffuser.

Frijlink fails to make up for the deficiencies of Murugesh et al., and Halsey et al. because Frijlink also does not teach or suggest a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle. Instead, Frijlink teaches a chamber with isolation means to prevent the reactive gases from flowing into spaces of the reactor other than the space immediately above the substrate holders and the wafers. Thus, Frijlink does not teach or suggest a baffle having first vanes on the first surface of the baffle and second vanes on the second surface of the baffle, nor does Frijlink teach a plurality of second vanes configured to direct the process gas expelled from the second terminus across the second surface of the baffle plate to clean the gas distributor, as in claim 11.

For these reasons, independent claim 11 and the claims dependent therefrom, claims 12-14, are patentable over Redeker et al. in view of Murugesh et al., Halsey et al. and Frijlink.

Claims 15-19

The Office Action rejected claims 15-19 under 35 U.S.C. §103(a) as being unpatentable over Murugesh et al., in view of Cheung et al., Halsey et al., and Frijlink.

Murugesh et al., Cheung et al., Halsey et al. and Frijlink do not teach claim 15 which recites, inter alia, a plurality of first vanes on the first surface of the baffle, the plurality of first vanes configured to direct the process gas expelled from the first terminus across the enclosing walls and interior chamber surfaces, each first vane comprising an arcuate plate that curves outward from the hub to the outer perimeter of the baffle; and a plurality of second vanes on the second surface of the baffle, the plurality of second vanes configured to direct the process gas expelled from the second terminus across the second surface of the baffle to clean the gas distributor, for the same reasons as presented above with respect to claim 1.

Thus for at least the same reasons as presented for claim 1, independent claim 15 and the claims dependent therefrom are patentable over Murugesh et al. in view of Cheung et al, Halsey et al. and Frijlink.

CONCLUSION

For the foregoing reasons, allowance of the present claims is respectfully requested. Should the Examiner have any questions regarding the above amendments or remarks, the Examiner is requested to telephone Applicant's representative at the number listed below.

Respectfully submitted,

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